Abstracts

Börner, Katy
21st Century Science Maps

Abstract: Cartographic maps of physical places have guided mankind's explorations for centuries. They enabled the discovery of new worlds while also marking territories inhabited by unknown monsters. Domain maps of abstract semantic spaces, see scimaps.org, aim to serve today's explorers understanding and navigating the world of science. The maps are generated through scientific analysis of large-scale scholarly datasets in an effort to connect and make sense of the bits and pieces of knowledge they contain. They can be used to objectively identify major research areas, experts, institutions, collections, grants, papers, journals, and ideas in a domain of interest. Local maps provide overviews of a specific area: its homogeneity, import-export factors, and relative speed. They allow one to track the emergence, evolution, and disappearance of topics and help to identify the most promising areas of research. Global maps show the overall structure and evolution of our collective scholarly knowledge. This talk will present an overview of the techniques and cyber-technologies used to study science by scientific means together with sample science maps and their interpretations.

Collins, Harry
Does electronic communication make any difference to the nature of expertise?

Abstract: I introduce 'The Periodic Table of Expertises' (Collins and Evans 2007). The classification is driven by the idea of tacit knowledge. Its most important division is between the expertise of those who have acquired tacit knowledge pertaining to a specialism as a result of social interaction with the relevant specialist community and those who use only 'ubiquitous tacit knowledge' to acquire specialist 'information' through their reading. I ask whether electronic communication blurs this dividing line; it does enable a huge increase in access to information. I conclude that electronic communication makes no profound difference but I try to explain why it might be thought to change things. Electronic communication can be understood only if we also understand the prior social relationships of those using electronic media.

Distler, Jacques
Blogs, Wikis, MathML: Scientific Communication in a New Century

Abstract: In the 1990s, the eprint arXivs fundamentally reshaped scientific

communication in Math and Physics. In this decade, blogs, wikis and other, similar, tools are mediating an equally profound reshaping of scientific communication. I will talk about my own experience, as a blogger, software designer, and physicist, pointing to some of the successes and some of the challenges ahead.

Fuller, Steve
Does there need to be a Social Contract for Metascience?

Abstract: There is a long history of metascientific instruments emerging 'spontaneously' (i.e. without the explicit consent of the sciences) and then equally 'spontaneously' adopted by the sciences themselves and science policy organs. The Science Citation Index is the most obvious case in point but at some point Wikipedia may follow suit. There are strong pressures in the direction of this 'metascientific' steering of science policy, not least the need to economise on the effort involved in learning first hand what scientists are doing. But at the same time, increasing amounts of money and potential impact are at stake. In that case, shouldn't there be some explicit negotiation about the relationship between metascience and science? But what would be its general principles and how would their adherence be monitored? These questions will be examined by looking at how history might bear on our current predicament.

Hannay, Timo
The Future is a Foreign Country: Science Publishing in the 21st Century

Abstract: The shift from print to online has already created a revolution in scientific communication, but it is far from complete. Among other effects, it has brought huge opportunities and threats to incumbent publishers. This talk will discuss the imperative for publishers to keep moving forward if they are to maintain their relevance in this new world.

Ginsparg, Paul
Next-Generation Implications of Open Access

Abstract: True open access to scientific publications not only gives readers the possibility to read articles without paying subscription, but also makes the material available for automated ingestion and harvesting by 3rd parties. Once articles and associated data become universally treatable as computable objects, openly available to 3rd party aggregators and value-added services, what new services can we expect, and how will they change the way that researchers interact with their scholarly communications infrastructure? I will

discuss straightforward applications of existing ideas and services, including citation analysis, collaborative filtering, external database linkages, interoperability, and other forms of automated markup, and speculate on the sociology of the next generation of users.

Kaiser, David

Toil, Trouble, and the Cold War Bubble: Physics and the Academy since World War II

Abstract: In the wake of recent swings in the values of technology stocks and the prices of real estate, many people have become (painfully) familiar with the boom-and-bust cycles of speculative bubbles. Although playing out on longer time-scales, student enrollments in the sciences have followed a remarkably similar pattern during the decades since World War II. The characteristic pattern can be seen in several countries, including the United States, Canada, and the United Kingdom. Enrollment patterns, and the specific policies that have been forged at various times to rapidly expand the number of trained scientists, sit at the intersection of science and society; they are where broad societal priorities and the infrastructure of higher education meet head on. Amid current discussions about globalization – especially fears of potential challenges from booming scientific and technical training efforts in India and China – the time is ripe to take stock of previous boom- and-bust cycles in our own recent past. How did they take hold, and what consequences have they had on the world of ideas? What intellectual trade-offs have been made, and with what impacts on the direction of scientific research? I will focus primarily on physics in the United States, which rose fastest and fell hardest during the postwar decades. The physicists example highlights the promise as well as the special challenges inherent in runaway growth, as fields such as genomics and nanotechnology undergo their own frantic expansion today.

Neylon, Cameron

Science in the open /or/ How I learned to stop worrying and love my blog

Abstract: The idea behind the 'Open Science Movement' is that by making data, results, and protocols freely available to the research community for use and re-use a step change in the efficiency of carrying out science can be achieved. In this talk I will discuss the experience of my research group in pursuing 'Open Notebook Science' in which we make our laboratory notebooks freely available on the web as experiments are recorded. This involves both the development and use of new tools to make the recording process practical

and useful and the cultural challenges of convincing other scientists that this is a worthwhile, and not completely foolhardy, approach.

Nielsen, Michael
Cultural openness and its connection to online innovation in science

Abstract: How can we best take advantage of the internet to improve how science is done? Much attention has been paid to open access and open data as enablers of online innovation. In this talk, I discuss the complementary issue of cultural openness in science, and argue that a relatively closed culture is inhibiting online innovation in science. I'll discuss ways this culture may be changed, and what opportunities may result.

Noveck, Beth
Designing Digital Institutions: Science in Government 2.0

Abstract: The current paradigm for decision-making is government is beset by instances of ideological bias and manipulation. The Bush-Cheney Administration, which imposed ideological litmus testing on scientific advisors, eliminated advisory panels, and selectively edited reports on environmental hazards and endangered species, represented the nadir of a slow descent into the abyss of abuse against scientific truth in policymaking that began with Nixon. Some of the consternation about 'science bending' can be discounted to inevitable and perhaps even desirable political disagreement. But there are also genuine problems with the practices by which government gathers, analyzes and distributes scientific expertise that open the door to this kind of political abuse and manipulation. Even in the absence of bad intentions, there is simply a lack of access to good information and useful ways of taking advantage of good science. In this talk, I develop the argument that technology is changing the nature of expertise in public decision-making and might afford new opportunities for the scientific community to inform policy-making. I put forward proposals for how to design a more collaborative culture that involves the scientific community more directly in decision-making.

Noveck, Beth
Design Exercise: Science Policy Making

I'd love to engage this group in a design exercise that follows from the talk, namely science policy and science policy-making in the 21st century. We could focus the conversation on how to improve decision-making about environmental policy by getting the conference participants involved in developing concrete suggestions for how to connect the scientific and governmental commu-

nities more closely in decision-making. I'll come with a few specific examples about clean air and water policy, climate change, and ocean management. As we transition in the United States to a new administration (and governments around the world look for new ways to embrace technology to improve the quality of governance) I'd like to engage people in thinking about how we create a culture within the scientific community of interest and participation in regulatory decision-making.

Odlyzko, Andrew
The evolution of scholarly communication and the supreme power of inertia

Abstract: The rapid technological change around us supports the idea of general speedup in the tempo of life, the illusion that we are living "on Internet time." Yet many changes are still taking generations, and that includes changes in scientific communication as well as in sociology of science. The evidence for wildly varying rates of changes, and the reasons for them, will be discussed.

Orzel, Chad
Talking to My Dog about Science: Weblogs and Public Outreach.

Abstract: At a time when the great challenges facing our civilization are scientific in nature (climate change, sustainable energy, pandemic disease), improving the voting public's understanding and appreciation of science is more important than ever. I will argue that the Internet in general and weblogs specifically provide an opportunity to address this problem, both through bringing science outreach directly to the public, but also by humanizing scientists to the public. I will illustrate with examples from my own experience blogging about physics for a popular audience, including explaining quantum mechanics to my dog.

Pang, Alex
Mapping Science in the 21st Century
Maps and visualizations have become an increasingly important part of scientific research and thinking in the last decades. More recently, maps of science have emerged as tools for understanding how the sciences have developed, and where they may go. The Institute for the Future, a Silicon Valley think-tank, has been conducting roadmapping exercises with groups of scientists around the world. These maps allow groups to develop a common vision of how science may progress over the coming decades; to see what trends are going to be especially important in different disciplines or regions; and to see explore how different futures cam emerge at the intersection of key trends. In this session,

IFTF researchers will lead an exercise to map major trends in the natural and social sciences, science policy and politics, public engagement with science, and IT that are most essential to understand science in the 21st century.

Smolin, Lee
Science as an ethical community

Abstract: I develop the idea that science works because scientists form communities defined by a set of ethical principles which, even if imperfectly applied, tend to lead to progress in our understanding of nature. While these communities have long been international, the combination of the internet with cheap airfare and easy migration of educated people makes scientists into 'global souls', in Pico Iyer's phrase. This opens up new opportunities and also new challenges for the thriving of scientific communities.

Weinstein, Eric
Sheldon Glashow Owes me a Dollar (and 17 years of interest): What happens in the marketplace of ideas when the endless frontier meets the efficient frontier?

Abstract: The emergence of novel funding structures in science may be seen as paralleling developments in financial engineering over the past 25 years. In this comparison, entities like FQXi, Perimeter Institute, CMI, Howard Hughes, the Gates Foundation and other funding agencies are emerging as "intellectual hedge funds" in response to perceived inefficiencies of more traditional agents, which play the role of mutual funds. Unfortunately, this experiment may prove less successful in the absence of instruments specifically tailored to hedge the uncertainties inherent in research which is both risky and potentially disruptive.
Markets are said to be incomplete or inefficiently structured when they fail in the allocation of scarce resources to optimally digest the views held by market participants. Time permitting, this talk will explore possible opportunities stemming from inefficiencies in the scientific marketplace of ideas:

- The risks of Injunctive Peer Review vs. Non-Invasive Short Selling

- Synthetic Tenure vs. Traditional Tenure

- Correlation Risks: Critical Mass vs. Diversification

- Managing Bleed from 'Long Volatility' Investing

- Self-Policing Fiefdoms: Balancing the benefits of expertise and specialization against counterparty risk, 'moral hazard', 'adverse selection' and 'rent-seeking' behavior.

- Risks from media mediation of scientific disputes and the economic roots of character attack.

- Costs and benefits from Immigration and the free flow of neurons across borders.

- Traditional One-to-One Advising vs. Eusocial Training

- Markets as systems of selective pressures: The riddle of successful adaptive valley crossers in recent scientific history.

Wellman, Barry (presenter) and Rainie, Lee

Networked Individualism and the Triple Revolution: Networks, Internet and Mobility.

Abstract: Three revolutions are coming together to shift people's social lives away from tight-knit family and neighborhood relationships towards more far-flung, less tight, more diverse personal networks. The internet revolution, the mobile revolution, and the social network revolution are producing a new societal reality we call "networked individualism." Analysts argue over whether this leads to social decay or utopia; we argue instead that social change is occurring that has both benefits and drawbacks. We use evidence from the Pew Internet and American Life project and the Connected Lives project to document key aspects of the transformation:

- Communication is from and to the person. This is a major change from situations when the household, the village or even the urban neighborhood were the major source of connectivity. For better or worse, people are connected as networked individuals. This means they have community, but it is less palpable than the organized groups of the past.

- People don't live online. Rather, they integrate a variety of communication media to stay connected - in-person encounters, formal meetings, phone calls by landline and mobile phones, emails, instant messaging, and more public Web 2.0 activities, such as listservs, social network sites, and blogs. Many of the minority who say they are not directly on the internet use it anyway, with their family and friends communicating and seeking information for them.

- Households are networks, not groups. Household members are in frequent contact, but not necessarily getting together as a solidary group. These are smaller households than in past decades, often with only one parent and often with no or only one child. Household members communicate in a variety of ways - hugs in passing, post-it notes, mobile phoning, and email. What they don't do is sit down and have family dinners every night or stay together on weekends.

- Relationships in the wider world are built around looser, rather than denser network groupings. Among other things, this means that people have a variety of social ties to count on, but not one sure-fire community home. Unlike people's lives in Pleasantville, they don't have the security of one big happy community. But they also escape the social control that comes from being in a densely-knit, bounded community. In these networks, people have more uncertainty, but also more maneuverability.

- People are their own switchboards, making, maintaining and breaking ties. Rather than sitting back and letting Mom or Sis take care of their networks, they must work more actively on maintaining each tie separately.

- People rely on multiple specialized relationships, rather than a few all-encompassing relationships. They access different parts of their networks to solve certain problems and to gain social support. They must shop in specialized boutiques for help instead of turning to close friends and family who, like a general store, provide all sorts of help

- People have partial membership in multiple networks and rely less on permanent memberships in settled groups. In this environment, people must deal with frequent turnover and change in their friendships, and they must be forever calculating where they can turn for different kinds of help.

- People have more long-distance relationships and more transitory relationships than in the past. While they still have neighbors, neighbors are only a small portion of their interpersonal lives. As a result, their life routines are different from the lives that their parents or grandparents led. They are traveling more by car and plane to see friends and relatives; and they are spending much more time using the internet and mobile phones to socialize with distant ties.

- The internet, mobile chatter, and in-person contact are in constant interplay in people's lives. Most still meet in person, and continue contact in between meetings via the internet. People expend new energy and effort to manage their networks through electronic and mobile connectivity. They also hyper-coordinate their schedules by using mobile phones to plan gatherings. Those who first meet online usually arrange to get together in person.

- People's networks are now larger. While the number of their strong ties – socially close relationships with friends and relatives - has stayed about the same, they have greater numbers of weaker ties. They have more "friendsters" than friends. Yet such weak ties can help them at times with crucial elements of information, sociability and support - e.g. as they seek jobs, cope with health issues, and make purchase decisions.

- People's work lives are built around more creative jobs rather than manufacturing or standardized paper pushing. This means that they have more reporting relationships and fewer hierarchical relationships. They typically work in multiple teams, rather than with one boss. They rely heavily on the internet, within-organization intranets, and mobile phones to obtain and share information.

- People now can obtain information from a greater variety of sources and are heavily using the internet for that purpose. This diversity both empowers people – they no longer need rely on "the experts" - but it also creates uncertainty about whom and what to trust. The result is that people cycle back and forth between the internet and dialogue with their friends - using in-person conversations, phone chats and emails to exchange opinions.

- People can now use the internet and other digital tools to create and contribute information to public discourse. They can do so with considerably greater ease and impact than in the past. This allows them to build new branches on their networks as they contribute to knowledge, conduct conversations, and rate/rank/review the content created by others.

These social changes are consequential in their own right, but they especially matter because people rely on their social networks more than in the past to help them learn things, assess options, make decisions, and solve problems. The explosion of information and communication sources has pushed people onto the path of greater involvement with their extended networks of people as they negotiate the complexity of modern life. At the same time, it has increased the potency of those who are active and important in their networks - who bridge different social circles, advise people, and help them to connect with each other.

Willinsky, John
Open Access Is Public Access

Abstract: This talk will review the public impact of developments in open access to research on education, professional practice, and public policy, with consideration given to legal, economic, and academic freedom issues, as well as to the very design of scholarly communication systems. The Public Knowledge Project has been conducting research on public interests in the new openness of research for a nearly a decade, and as a result, continues to explore how the creation of new reading environments for the online publication of journals and books can provide a wider range of readers with what might otherwise be the missing context for the work they are now able to discover online.

Wilson, Greg
Can the Web Make Scientists Brush Their Teeth?

Abstract:Computation is increasingly important in all branches of science, but most scientists have no idea how reliable their software is, and cannot reproduce even their own computational results if more than a few weeks have passed. "Live on the web" labs and other new ideas promise to change this, but face an uphill battle against entrenched practices and institutional lethargy.

This talk looks at how we got into this mess, what could get us out of it, and how likely scientists are to actually embrace change.